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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: BAYER -3 PCT

SERIAL NO.: 10/049,173 EXAMINER: ROGER PANG

FILED: FEBRUARY 8, 2002 GROUP: 3681

TITLE: PLANETARY TRANSMISSION

# REPLY BRIEF

MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is in Response to the Examiner's Answer dated September 8, 2005.

U.S.P.T.O. Rule 41.41(a)(1) states that:

> (a) (1) Appellant may file a reply brief for an examiner's answer within two months from the date of the examiner's answer.

On page 3 of the Examiner's Answer the Patent Examiner has maintained the rejection of Claim 9 under 35 U.S.C. 103(a) as being unpatentable over *Ridgely '967*.

On page 4 of the Examiner's Answer, it is admitted that *Ridgely* does not specifically teach the number of teeth to be 108 or the ratios of the second stage and third stage being 4 and 5.5, respectively. It was then argued that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify *Ridgely* to employ specific number of teeth and specific ratios, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In *re Rose*, 105 USPQ 237 (CCPA 1955).

On page 4 of the Examiner's Answer, the Patent Examiner has repeated the rejection of Claim 8 under 35 U.S.C. 103(a) as being unpatentable over *Shirokoshi '968* (U.S. equivalent: *US Patent No. 6,099,432*).

On page 4 to 5 of this Examiner's Answer, it is admitted that *Shirokoshi* does not specifically teach the number of teeth to be 108 or the ratios of the second stage and third stage being 4 and 5.5, respectively. It was then argued that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify *Shirokoshi* to employ specific number of teeth and specific ratios, since such a modification would have involved a mere change in the size of a component. A change in

size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

These rejections are respectfully transversed, as believe4d to be in error for these reasons. Firstly, in the case *In re Rose,* there was only one variable relating to amount of pieces of lumber in banded bundles that do not interact with each other.

In the claimed invention, there are at least three variable that interact together to produce unexpected results as proven in the Declaration Under Rule 132. In other words, the planet carriers 8 and 5 of the second stage II and third stage III respectively are each provided with four planet wheels 7 and 11 respectively in a circumferential direction, and wherein

- the internal gears (6, 12, 13) each have a number of teeth z = 108 in all three stages,

- the transmission ratios are i = 4 for the second stage II and i = 5.5 for the third stage III.

(See page 2 lines 15 to 27 and page 3 lines 1 to 18 of Specification).

The three variables which interact are z = 108, i = 4 and i = 5.5 as claimed. These unique and specifically claimed structural limitations cannot be ignored by the Patent Examiner, and cannot be disregarded, based upon all of the cases cited in the Appeal Brief of the Appellant.

The Patent Examiner has attempted to compensate for the admitted nondisclosure in the prior art of these three claimed variables that interact with each other to produce unexpected results. Thus the newly cited *Ganoung US 5,045,035* is prior art and is currently being applied as a reference. It was alleged that this discloses a regular transmission patented in 1991. This transmission allegedly illustrates a non-even translation ratio.

In *Ganoung* the third speed has a 1.35 translation ratio, which is a non-even translation ratio. Non-even translation ratios have allegedly been known in the art, because a translation ratio is a mathematical formula that uses the number of gear teeth as a variable.

The formula for the translation ratio of a planetary gear set was derived from the newly cited handbook reference *Shigley and Mitchell*.

These two newly cited references to *Ganoung* and the handbook do not teach or suggest the above-noted three claimed variables that produce unexpected results as shown in the Declaration Under Rule 132 for the invention. One skilled in the art would never be able to derive the claimed structure of the present invention from any combination of these prior art teachings. For example, the 1.35 translation ratio of *Ganoung* does not suggested the claimed i = 5.5.

Furthermore, as show in the Rule 132 Declaration, the inventor was able to find that in a gear stage having four planet gears, as compared with a gear stage having only three planet gears, a significantly greater maximum (135%) torque can be achieved. The related increase in the torque is shown in Diagram No. 5, by means of a comparison of the ratios for three (100%) and four (135%)planet gears in a gear stage, wherein i=5.5. This increase in load capacity from 100% for three planet gears up to 135% for four planet gears at i=5.5 and with 108 teeth internal gear was totally unexpected and was unpredictable.

On page 8 of the Examiner's Answer, it was argued that a prior art reference need not be found with these exact numbers for z = 108, i = 4 and i = 5.5, because allegedly the formula for the translation ratio is known in the art. As pointed out above,

the Appellants have shown unexpected and unpredicted results in the Rule 132 Declaration. This clearly negates the argument that a general formula has value to anticipate the claimed three specific variables that work together to cause the transmission to produce the unexpected results discussed above.

On page 8 of the Examiner's Answer, the Patent Examiner has contended that the "unexpected result" argument only arose in the biological and chemical arts and thus would not apply to the mechanical arts wherein the number of teeth is changed to manipulate a translation ratio. This is respectfully traversed.

The case *In re Aller* cited by the Patent Examiner is based upon a chemical reaction, which case was applied against the present mechanical structure. Moreover, the leading case *Graham v. John Deere* from the U.S. Supreme Court cited in the Appeal Brief, does not prevent the consideration of unexpected results in mechanical cases. In fact, the case *Graham v. John Deere* encourages the consideration of unexpected results.

More particularly, the *Ganoung U.S. Patent No. 5,045,035* newly introduced into the proceedings by the Patent Examiner does not relate to the problem solved by the present invention, nor to its solution, in any way.

The claimed invention relates to industrial gear mechanisms in which whole-number translation ratios are generally required between the input rpm and the output rpm.

The newly cited prior art gear mechanism relates to a motor vehicle transmission in which translation ratios that are not whole-number ratios are not problematical.

Furthermore, of course the invention does not consist exclusively of achieving a whole-number translation ratio. A whole-number translation ratio is merely a basic criterion that must be met for industrial gear mechanisms. Proceeding from this, the actual invention consists of achieving a particularly high torque, while simultaneously adhering to a whole-number translation ratio, at a translation ratio of $i = 4$ in the second stage, and $i = 5.5$ in the third stage. This is furthermore achieved, to a surprisingly high degree, by means of the use of four planetary gear wheels in the second and third stage, in each instance.

In total, the invention consists of the concrete selection of the aforementioned characteristics, in particular, specifically in connection with all of the characteristics of the current claims 8 and 9. This is a selection invention, which is

not made obvious by combining all of the documents found for the prior art. The advantages that result from the individual aforementioned criteria, in each instance, are quite clearly shown by the Diagrams 1 to 4 and in the discussion of results submitted within the Declaration Under Rule 132, which was filed with the Appeal Brief. These diagrams show, in each instance, that every individual selection criterion offers advantages. Therefore, the combination of these criteria, according to the invention, produces a result that is unexpectedly good, overall, and could not be achieved by means of exclusively pursuing the known design rules and formulas of planetary gear mechanisms.

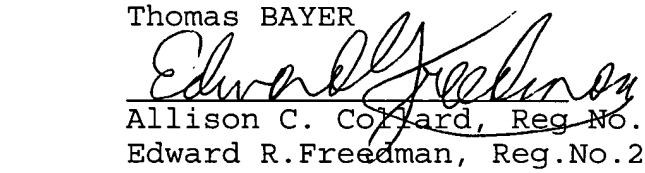
The economic success that the applicant immediately achieved with the market introduction of the claimed gear mechanism, which continues up to the present, shows that the invention does, in fact, involve an unusually good result.

Furthermore, it should also be pointed out that the corresponding European patent was already awarded on June 26, 2003, and has been respected by the competition up to the present.

In conclusion, the present invention, and all the claims, are believed to be patentable under 35 U.S.C. 103 over all the

prior art applied by the Patent Examiner. A prompt notification of allowability is respectfully requested.

Respectfully submitted,
Thomas BAYER



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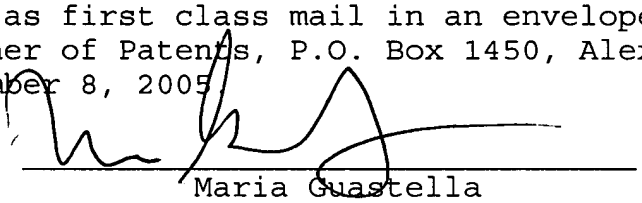

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